

PCT

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2006/006799

International filing date (day/month/year)
24.02.2006

Priority date (day/month/year)
24.02.2005

International Patent Classification (IPC) or both national classification and IPC
INV. C03C3/087 C03C13/00

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Date of completion of
this opinion

see form
PCT/ISA/210

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2006/006799

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

- ☐ the entire international application
- ☒ claims Nos. 1-6,25-28 (all in part)

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):
- ☒ no international search report has been established for the whole application or for said claims Nos. 1-6, 25-28 (all in part)
- ☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:
 - ☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
 - ☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
 - ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13ter.1(a) or (b).
- ☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-bis of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.
- ☐ See Supplemental Box for further details

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	7,15,16,21-24,33
	No: Claims	1-6,8-14,17-20,25-32
Inventive step (IS)	Yes: Claims	
	No: Claims	1-33
Industrial applicability (IA)	Yes: Claims	1-33
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V.

1 Reasons for the limitation of search

1.1 The present claims 1-6 and 25-28 relate to an extremely large number of possible products (see also clarity objections under Item VIII below).

Support and disclosure in the sense of Article 6 and 5 PCT is to be found for only a very small proportion of the products claimed, see page 9, line 22-page 11, line 7 and examples. The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of claims 1 and 25-28 (PCT Guidelines 9.19 and 9.23).

1.2 Therefore the search of claims 1-6 and 25-28 was restricted to those claimed products which appear to be supported and a generalisation of their structural formulae, (see claims 7-15, 20-24 and 31-33 and examples).

2 Reference is made to the following documents:

D1: US 4 304 604

D2: GB 1 493 203

3 INDEPENDENT CLAIM 8

3.1 The below-mentioned lack of support and clarity notwithstanding (see Item VIII), the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 8 is not new in the sense of Article 33(2) PCT.

3.2 The document D1 discloses:

An alkali-resistant glass, used for reinforcing cementitious articles, which comprises 49.2 wt% SiO₂, 12.7 wt% Al₂O₃, 9.2 wt% Fe₂O₃, 7.2 wt% CaO, 10.7 wt% MgO, 4.8 wt% K₂O+Na₂O, 2 wt% TiO₂ and 4.2 wt% ZrO₂ (See D1, example 1). This glass corresponds to the examples of the present application and therefore the subject-matter of claim 8 is not new.

4 INDEPENDENT CLAIM 31

The same reasoning as above applies, *mutatis mutandis*, to the subject-matter of the corresponding independent claim 31, which therefore is also not considered new.

5 INDEPENDENT CLAIM 21

5.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 21 does not involve an inventive step in the sense of Article 33(3) PCT.

5.2 The document D1 is regarded as being the closest prior art to the subject-matter of claim 21 (See point 3.2 above).

5.3 The subject-matter of claim 21 therefore differs from this known D1 in that the glass is treated in a basic environment to form a passivity layer.

5.4 The problem to be solved by the present invention is regarded as how to improve the alkali resistance of the glass.

5.5 The solution proposed in claim 21 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) because a similar treatment to a similar glass resulting in the same effect is disclosed in document D2 (see D2, page 1, 6th paragraph). A skilled person would combine the knowledge from documents D1 and D2 and arrive to the subject-matter of claim 21 without using any inventive skill.

6 INDEPENDENT CLAIM 25

6.1 The above- and below-mentioned lack of clarity and support notwithstanding, the subject-matter of the independent claim 25 is not new in the sense of Article 33(2) PCT.

6.2 Synthetic, hollow microspheres are known in several fields of technology and also in the field of alkali-resistant glasses. Document D2 discloses similar glass compositions which are suitable for reinforcement of cement and take the form of

hollow spheres (see D2, page 1, 2nd paragraph). The subject-matter of claim 25 is therefore not new.

7 DEPENDENT CLAIMS

Dependent claims 2-7, 9-16, 20, 22-24, 32, 33 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step for the following reasons:

7.2 The dependent claims 2-6 refer to the unclear claim 1 and to the vague term "passivity layer". The composition of the glass seems to give rise to a passivity layer (a layer which prevents further reaction of the glass with corroding environment of cement) in alkaline conditions met in cement and therefore, as mentioned below, the passivity layer is the result to be achieved by the technical features of the glass. It is however known and disclosed in D2 that glasses with a similar composition as that of the present application react with cement to produce products on the glass surface which protect the glass from further reaction (see D2, page 1, 6th paragraph and claim 1). The subject-matter of claims 2-6 is therefore not new.

7.3 The dependent claim 7 further describes the composition of the glass, which gives rise to the passivity layer. A similar composition is however disclosed in D1. The combination of D2+D1 renders claim 7 not inventive.

7.4 The subject-matter of claims 9-14, 20 and 32 are disclosed in D1 and is therefore not new.

7.5 The subject-matter of claims 17-19 describes a result achieved by the composition of claim 8-13 in alkaline environment (=environment in the cement). Since D1 discloses the same glass composition and is also used in cement, it is assumed that same reaction occurs between the glass of D1 and cement environment. Thus it is implicit that a similar "passivity layer" forms on the surface of the glass of D1 and therefore the subject-matter of claims 17-19 is not new.

7.6 The subject-matter of claim 15 is disclosed in D2. The combination of D1+D2 renders claim 15 not inventive.

7.7 Claim 16 describes the rate of production of the hollow spheres. There is however no description about what is the effect of this rate on the properties of the glass and in general how this production rate is relevant to the subject-matter of the present invention. Therefore no inventive step can be recognized.

7.8 The effect of temperature as described in claims 22 and 24 is not apparent from the description and therefore the problem to be solved by claims 22 and 24 is regarded as how to provide an alternative to the method of D2. Experimenting with different temperature ranges is regarded as normal laboratory procedure without exercising any inventive skill. Therefore claims 22 and 24 are not considered involving an inventive step.

7.9 The subject-matter of claims 23, 29 and 33 is disclosed in document D2 and thus the combination D1+D2 renders claim 33 not inventive.

Re Item VIII.

1 The application does not meet the requirements of Article 6 PCT, because claims 1-5, 8, 17-19, 21, 25-31 are not sufficiently clear and/or supported by the description.

1.1 The term "passivity layer" used in claims 1, 4, 5, 17, 18, 19, 21, 25-30 is vague and unclear and leaves the reader in doubt as to which technical features it refers, therefore rendering the subject-matter of claims 1, 4, 5, 17, 18, 19, 21, 25-30 unclear, Article 6 PCT.

1.2 Additionally, claims 1, 4-6 and 17-19 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved (formation of a "passivity layer"), without providing the technical features necessary for achieving this result.

1.3 Claims 4, 5, 18, 19, 26-30 do not meet the requirements of Article 6 PCT, because they are not sufficiently supported by the description, as there is no sufficient support in the description for the structure, composition, thickness, properties or location of the "passivity layer" on the surface of the alkali-resistant glass. In the description it is stated that a passivity layer is believed to be formed but no concrete examples are given (see page 21).

1.4 The terms "the substance and "other substances" used in claims 1-3 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claims unclear, Article 6 PCT.

1.5 The subject-matter of claims 7-12 and 21 is neither sufficiently disclosed, clear nor supported as required by Articles 5 and 6 PCT, as there are no examples of such glasses in the description, which essentially consists of more than 35 wt% SiO₂, 1-15wt% Fe₂O₃, 1-25wt% CaO, 1-10wt% R₂O and such an amount of Al₂O₃ that $\text{Al}_2\text{O}_3/\text{SiO}_2 \geq 1$. All examples given in the description contain also TiO₂ and/or ZrO₂ and MgO and in fact these materials are described as being part of the invention (see page 10). Thus the term "essentially consist of", used in claims 7, 8 and 21 and referred back to in claims 9-12, renders these claims unclear.

1.5 Although claims 1, 8, 31 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

1.6 Additionally, independent claim 25 refers to subject-matter, which does not have any technical features common with the other independent claims 1, 8, 21 and 31. Therefore the claims in their present form lack unity. However, the subject-matter of claim 25 (synthetic microspheres) is not novel and therefore no objection is presently raised for non-unity. It should also be noted that there is no support in the description for the subject-matter of claim 25, there is only support for an alkali-

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International application No.

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resistant glass of certain composition, which might take the form of hollow spheres.